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Remarks as Prepared for
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for the
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Thank you, Mayor Battle, for your kind introduction. I especially want to thank you, Mayor, for your hospitality during the past two days. Sir, you have gone above and beyond the call to make us feel welcome and show us how without a doubt, the Huntsville area plays a leading role in the geospatial industry.

It is a real pleasure to be here in "Rocket City" again. I often visited the Missile and Space Intelligence Center – MSIC – during the years I worked for the Defense Intelligence Agency. I have always appreciated the superb quality of MSIC's assessments of foreign missile and space systems. I look forward to seeing my old friends during my visit to MSIC tomorrow. I do have one regret whenever I visit the U.S. Space & Rocket Center ®, however. I am too old to attend Space Camp ®!

For two generations, the Space and Rocket Center, Space Camp, and all of your activities have spurred millions to stretch their imaginations and to dream of the possibilities of space exploration and scientific advancement.

As importantly, the Center has encouraged a love of scientific learning among thousands of children and young adults. They have pursued their passions in science, technology, engineering, and mathematics that the nation so desperately needs. They have become astronauts, engineers, scientists, and technologists who continue to lead our space program. Many of them have become our top thinkers in science, business, and government.

The long-term success of this Center is only one of the many successes that the collaboration among industry, academia, and government in the Huntsville area has created. NGA shares your commitment to collaboration and integration. Our long-time partnership with MSIC through our NGA Support Team – NST – demonstrates that

commitment. Our NST enables positive consequences for our MSIC customers with scientific and technical assessments based on a geospatial intelligence framework.

NGA's partnership with MSIC is just one example of the positive results that integration and close collaboration can create to protect national security. Your Eighth Annual GEO-Energy Summit highlights many other examples and serves as a launching pad for even closer collaboration among the 50 companies, 20 government agencies, and three universities represented here today.

You have unparalleled resources and unparalleled opportunities to focus the power of geospatial information on our challenges in critical energy infrastructure, energy management, earth observation and imaging, and of course, national security. And you are leading the way with three initiatives that interact, integrate, and collaborate in ways that will have a positive impact on national security.

Your major initiatives in geospatial intelligence, energy sustainability, and cyber warfare threat detection seek to help solve three of the nation's most pressing security problems. NGA is inextricably linked in partnership with you, with the Department of Defense, and with the Intelligence Community to pursue solutions to these challenges.

Let me take a few moments to discuss why and how NGA shares your interests so you can better understand our role in these three areas of geospatial intelligence - GEOINT, energy sustainability, and cyber warfare threat detection.

As many of you know, NGA is the global leader in GEOINT. Our purpose is to provide geospatial intelligence that ensures the success of a wide range of customers, especially the President of the United States, Senior policy makers, warfighters around the world, global humanitarian relief efforts, and first responders nationwide.

Let me briefly tell you a story about how GEOINT recently helped the President, our military, and humanitarian groups save lives in Iraq. Several months ago, as you may recall, tens of thousands of Yazedis and Christians in Northern Iraq were fleeing from the Islamic State of Iraq and the Levant – ISIL – terrorist attacks and atrocities. They were trapped in northern Iraq on Sinjar Mountain.

At the time, our senior leaders and military planners were unsure on how best to deliver humanitarian aid and to evacuate the Yazedis and Christians. NGA foundation data

helped the customers understand the complex and severe terrain. Our detailed analysis identified the best airdrop locations and evacuation corridors. We layered multiple types of data—roads, elevation, populated areas, weather conditions, the ISIL threat, and the like—with all-source reporting.

The integrated intelligence picture gave our senior leaders and military commanders the context they needed to anticipate what might happen when combat operations, adversarial actions and humanitarian activity interacted. Day in and day out throughout this crisis, integrated GEOINT made these key customers aware of the real-time status of refugees and the airdrops.

The consequence?

NGA enabled our Senior leaders to make crucial timely decisions. And thousands of Yazedis and Christians escaped and their lives were saved. This is just one example of the vital consequences that GEOINT delivers every day to Senior leaders, our military, and our first responders.

While many of you may be aware of NGA's role in advising Senior leaders, military planning, and humanitarian aid, we also have a growing role to play in cyber defense. Most people think of cyber defense as stopping electronic attacks—that is, preventing the bits and bytes from bugging our systems. But all those bits and bytes flying through cyberspace start and stop somewhere in physical space and time. They have a geolocation and a georeference.

Three years ago, General Keith Alexander, then-Commander of Cyber Command and NSA Director, came to NGA with a simple request: Find the bricks and mortar that launch and sustain cyber attacks. Since then, working closely with our partners, NGA has developed a robust and growing cyber capability that works to identify the physical facilities and networks that originate cyber attacks. I cannot go into specific actions, but I can assure you that we are now far better prepared to defend our essential domestic electronic infrastructure than we were before.

GEOINT plays an equally important role in this Summit's theme of energy sustainability. The Global Trends 2030 report published by the National Intelligence Council two years ago paints a bright energy outlook for the United States during the next 20 years. It says that although global energy demand will rise about 50 percent during the next 15 to 20

years, steadily rising global production will meet or exceed that demand – especially for the U.S. market.

This tectonic shift means that for the first time in generations, the U.S. will become energy independent thanks to the oil and natural gas revolution and the growth of alternative energy sources. Even greater resources are available from our neighbors in Canada and Mexico. Reduced ice coverage has opened up even more potential reserves in the Arctic.

For example, according to a recent report from the U.S. Energy Information Administration – EIA - the production of shale oil in the U.S. will more than double to almost 5 million barrels a day by 2021. The EIA's early release of its 2014 Annual Energy Overview also predicts that total domestic oil production will reach or exceed its previous highs of 9.6 million barrels a day. These are totals we have not seen since the 1970s.

The EIA report also stressed that low natural gas prices and ample gas supplies will boost natural gas-intensive industries. Natural gas also will overtake coal as the largest producer of electric power. Combined with rising fuel economy in vehicles, more energy-efficient homes, and industry conservation efforts, these factors will make us energy independent.

The EIA report supports the Global Trends 2030 predictions that "significantly lower energy prices will have significant positive ripple effect(s) for the U.S. economy." Companies will either return to or locate in the U.S. to take advantage of these lower energy prices.

This revolution will sharply increase our Gross Domestic Product (GDP), add millions of jobs, significantly enhance our balance of trade, and have a dramatic impact on energy producers, like Russia and Venezuela, that depend on high energy prices to balance their budgets and subsidize their economies.

And Global Trends 2030 stressed that this revolution could happen not only in the U.S., but also in Europe and China where large supplies of shale gas are available. If these regions take advantage of these resources and technologies to exploit them, they can dramatically reduce their own dependence on foreign sources.

In one scenario, the long-term consequences of this revolution could affect the power of OPEC to control prices and of Russia to use energy as an economic weapon against its neighbors. It could also mean less long-term competition for energy resources between the U.S. and China in the Middle East and Africa, and relax tensions among the nations in the South China Sea or increase them. Regardless of what happens in the future, the geospatial information about the location and scale of these global resources will continue to be the unappreciated driver of this revolution.

Combining the power of GEOINT with the power of energy technology to secure our energy future will send a powerful message at this important moment in US history. These once-in-a-generation factors make you at the Conference vital contributors to our energy independence. Your many worthy domestic initiatives rest on a foundation of geospatial technology. Even as supplies increase in the near term, we must plan to use them wisely in the future. Smart grids for smart cities, critical infrastructure protection, conservative energy management for military installations, and more.

We must continue to pursue all of these technologies. True long-term energy security depends as much on efforts like yours that will transform how the nation conserves energy as it does on securing new supplies of finite energy resources.

NGA plays a domestic role in energy security only during disaster response and recovery efforts. We work through stringent legal guidelines, and we can act only when a lead Federal agency, usually the Federal Emergency Management Agency, asks for our assistance.

NGA plays a vital role to encourage collaboration and integration among the first responders by being transparent on the web with commercial software. We work closely with the first responders to provide pre- and post-disaster data so they can quickly understand the damage to critical energy infrastructure.

We create online Event pages open to all first responders on the World Wide Web. They can upload their data from their mobile devices and share that data with everyone who needs access to it. We provide thorough analyses into the impact of a disaster on roads and bridges, power grids, shorelines, flooded areas, and the like. With all of the up-to-date data, FEMA managers then can allocate their scarce resources to where they are most needed, saving time and lives.

NGA's well-known and well-respected work in disaster recovery allows NGA to play a vital role in building the public's confidence in the intelligence community. Director of National Intelligence James Clapper has said that GEOINT "has a great advantage in our current environment because it is the most transparent of the collection disciplines."

The world of GEOINT is becoming increasingly transparent because of the huge number and diversity of commercial and open sources of information. NGA is uniquely positioned to lead the Intelligence Community and demonstrate the value of intelligence to the American people.

Our successful, open disaster response partnerships with FEMA and state and local first responders have led to a ground-breaking initiative in transparency and open sourcing. Called GitHub, it is a popular code repository site open to all developers. So far, NGA has posted on this repository more than 15 projects that enable open access to cutting-edge geospatial tools. NGA's GitHub site, a first within the IC, opens a portal to any organization—across industry, academia, or government—that wants to use these tools to create innovative disaster response applications. In a few moments, my colleague Ray Bauer will come up and explain the details.

Let me stress one more equally critical point about GitHub and NGA's efforts to be more transparent: We see and appreciate industry and academia as partners. We know that we cannot keep up with the rapid pace of change in the commercial sector. And we want academia to continue to discover new GEOINT technologies and methodologies.

We want you to work with our innovators and scientists to bring us your best ideas and help us learn how NGA can take advantage of them. I'm reviewing a special pilot to accelerate our progress here. For example, in this area, you have leaders in commercial earth observation satellites and unmanned aerial systems. Both are essential to our persistent GEOINT initiative concept of operations. We are integrating and expanding our capabilities—satellites, airborne, ground-based, and open sources. We need to be able to constantly monitor our most important areas so we can discover critical patterns of activities and anticipate the actions of our adversaries.

You also have capabilities in 3-D visualization and building information modeling. Right now, you have focused on the worthy goals of infrastructure design, emergency response, and energy management. NGA has a pressing need to turn "big data" into

simple visual graphics that convey insight to Senior leaders. Given my four-year tour in the West Wing, I can attest personally to the opportunity here.

When we benefit from your research, development, and innovation, it is our job to add our expertise, insights, and unique capabilities to provide a better intelligence service for our customers. To better understand what I mean by a better intelligence service, let me ask you to look at NGA's role through a new lens—the lens of consequence. Looking through this new lens, you can see how NGA enables the best consequence for our customers.

That consequence can be anything that positions our customer to succeed. Perhaps an advantage we gain over an adversary, a decision that leads to a positive outcome, or a new disaster response application that saves time, resources, and lives.

Let me tell you a story about how, right now – today - NGA is playing a vital behind-the-scenes role in the Ebola crisis in West Africa and enabling positive customer consequence. How this crisis has unfolded shows how a seemingly local, but terrible problem can quickly become a global crisis and demand a global response. The President has called the Ebola crisis a national security issue because it affects international trade and air travel, international politics, the economies and the stability of developing countries, and potentially, the American people. This crisis also has brought about unexpected, yet very gratifying examples of partnership and collaboration.

Throughout this crisis, NGA analysts have taken our commanding knowledge of the earth and its features in Liberia, Guinea, and Sierra Leone, and we have analyzed complex variables, such as access to government services and health care, food and water supplies, and the transportation infrastructure. NGA has produced easy-to-understand, unclassified graphics that have guided decisions by the national security community, the UN World Health Organization, the Centers for Disease Control and Prevention, many international partners, and many non-governmental organizations – NGOs. Our work has helped them better understand the human geography and social-cultural issues affecting the spread of Ebola through the region.

And when the President ordered the 101st Airborne Division to deploy and build hospitals in Operation United Assistance, NGA analysts immediately stepped up to analyze the terrain and infrastructure to identify the best, safest locations for the

hospitals while keeping US service members out of harm's way. But I have been most impressed by a simple story about the impact one person can make in this terrible situation. An NGA analyst, embedded with the 101st Airborne, is working on the ground in Liberia with the Joint Forces Command—Operation United Assistance to help upgrade the country's essential, but out-of-date maps.

Using current unclassified commercial imagery, the NGA analyst sits directly with Liberian analysts who work for the Liberian Institute of Statistics-Geo-Information Services or LISGIS. You can imagine how important it is right now for the Liberian government to have accurate maps of the areas hardest hit by the Ebola epidemic as well as the medical and transportation infrastructure to combat the disease.

The NGA analyst downloaded more than a terabyte of up-to-date commercial imagery. The Liberians added their local knowledge. Our analyst and his Joint Force colleagues trained the Liberians in new techniques that have saved hours and days of effort. Right now, working together, they are identifying safe helicopter landing zones for supply drops, supporting the US military in locating hospital sites, and creating accurate maps of vital areas. That is just the beginning of the positive consequences of these small acts. In the future, the Liberians will be able to use their new content and techniques well beyond the current crisis to build a modern geospatial database about their country for a future census and future elections. While we have posted our context on the worldwide web, we have much to learn as this will be more and more common and more and more necessary.

This story of one analyst's daily work shows how seemingly small acts of collaboration lead to major consequences for our customers. Whether the customers sit in the White House or in a white tent in West Africa, NGA is dedicated to putting the power of GEOINT to work to create the consequences they need.

I believe that like NGA, the GEO Huntsville community is uniquely positioned to leverage your geospatial capabilities and your energy technologies to enable outstanding consequences that sustain our nation's future energy security needs.

We are a vital turning point, and I encourage you to collaborate to realize your vision to drive forward toward energy independence.

Now, I would like to ask Ray Bauer to come up and discuss with you Geospatial Transparency, Relevance, and Innovation. And after their presentation, we will be happy to take your questions.

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